

PILOTS OPERATING MANUAL

MURPHY MOOSE M14P RADIAL

This manual is intended as a guide only. Amateur built aircraft vary a great deal in their construction standard, equipment and handling. If you intend to fly any aircraft with which you are unfamiliar ***you must undertake a thorough checkout with a suitably qualified pilot.***

This manual refers specifically to the Murphy Moose with a maximum gross weight of 3500 lbs.

Fixed tailwheel landing gear and powered by the M-14P 9 cylinder radial engine.

All information is given assuming a factory standard Super Rebel with no modifications.

KIT No.

LIMITATIONS

Maximum gross weight 3500 lbs.

This aircraft is not approved for aerobatics or spins.

ENGINE

M14P 9 Cylinder Radial

360 H.P.

AIRSPEEDS FOR EMERGENCY OPERATION

Engine failure after takeoff.....	75 mph.
Maximum glide.....	75 mph.
Landing without engine power.....	75 mph.
Short final.....full flap.....	65 mph.

OPERATIONAL CHECKLIST

Engine Failure During Takeoff

- a) Throttle.....idle.
- b) Brakes.....apply.
- c) Flaps.....retract.
- d) Mags.....off.
- e) Master switch.....off.
- f) Door.....unlatch.

Engine Failure Right After Takeoff

- a) Airspeed.....75 mph.
- b) Fuel valves.....off.
- c) Mags.....off.
- d) Flaps.....as required.
- e) Master.....off.
- f) Door.....unlatch.

Engine Failure During Flight

- a) Airspeed, trim to.....75-80 mph.
- b) Carb heat, alt. air.....on.
- c) Primer (carb engine).....in & locked.
- d) Boost pump.....on.
- e) Elec.....on.
- f) Left fuel.....on.
- g) Right fuel.....on.
- h) Restart.....attempt.

FORCED LANDING

Emergency Landing Without Engine Power

- a) Trim.....flaps up 75 mph.
flaps dn 65 mph.
- b) Fuel valves.....off.
- c) Mags.....off.
- d) Flaps.....full.
- e) Master.....off.
- f) Doors.....unlatch.

FIRE

Engine Fire On Start

- a) Continue cranking to suck fire & fuel into engine.
If engine starts, run at 1800 for 1 min. then shut fuel off.
- b) Engine.....shut down inspect for damage.
- c) If engine fails to start continue cranking while shutting off fuel, mags and master.
- d) Obtain fire extinguisher.
- d) Evacuate aircraft.
- e) Extinguish fire.

Engine Fire In Flight

- a) Fuel.....off.
- b) Cabin air/heat.....close.

WHEN ENGINE STOPS

- c) Throttle.....close.
- d) Mags.....Off.
- e) Airspeed.....increase to find incombustable mixture.
- f) Forced landing.....execute.

Electrical Fire In Flight

- a) Master.....off.
- b) Cabin air/heat.....close.
- c) Extinguisher.....activate.
- d) Ventilate Cabin

AIRSPEED INDICATOR MARKINGS

Arc colour	KTS.	M.P.H.	Operating range
White arc	48-75	55-86	Full flap operating range
Green arc	52-139	60-160	Normal operating range
Yellow arc	139-164	160-189	Operate with caution, Only in smooth air
Red line	164	189	NEVER EXCEED

Speed	KTS	M.P.H.	Remarks
Never exceed V_{ne}	164	189	Do not exceed
Max. structural cruising V_{no} or V_c	139	160	Do not exceed except in smooth air.
Manoeuvring V_a	113	130	No full or abrupt control movements above this speed.
Max. flap ext. V_f / V_{fe}	75	86	No full flaps above this speed.

Best angle climb V_x 56-60 65-70 3 notch flap.

Best rate climb V_y 70 -87 80-95 2 notch flap.

Max cross wind 14 kt 16 mph.

CENTRE OF GRAVITY
CONVENTIONAL GEAR

Datum line = Main Wheel Axle

Basic distances : Pilot/ front passenger15"
 Rear passenger.....51"
 Baggage70"
 Fuel 29"

The allowable center of gravity ranges for all Super Rebels and Moose models are from 10.8" to 20.4" aft of the datum line or 18 to 34% of wing cord. (M.A.C. mean aerodynamic cord)

Forward limit = 10.8" A.O.D.

Aft limit = 20.4" A.O.D.

To determine empty weight center of gravity:

- 1/ Place aircraft in level flight attitude, with a suitable scale under each wheel.
- 2/ Record weight on each wheel.
- 3/ Measure the distance from main wheel center to tail wheel center, 90° to main axle.

Sample Empty Weight:

Scale position	<u>Wt.lbs.</u>	Arm,inches	<u>Moment</u>
Left main.....	942.....	-1.5".....	-1413
Right main.....	930.....	-1.5".....	-1395
Tail wheel.....	66.....	242".....	15972
Totals.....	1938.....	6.79".....	13164

Total moment 13164 divided by total weight 1938 = 6.79 inches aft of datum. THIS IS THE EMPTY WEIGHT CENTER OF GRAVITY

Forward sample loading:

	Wt.lbs	Arm,inches	Moment
Empty Weight	1938.....	6.79".....	13164
Front Seat, pilot	176.....	15".....	2640
Rear seat	0.....	50".....	0
Fuel, 20 gal.	120.....	29".....	3480
Baggage	0.....	70".....	0
Totals	2234.....	8.63".....	19284

Total moment 19284 divided by total weight 2234 = 8.63" aft of datum. This is NOT between the limits of 10.8" and 20.4". The aircraft is at an UNACCEPTABLE weight and balance for flight.

By adding a 35lb. survival kit in the tailcone at 150"

Totals from above	2234.....	8.63.....	19284
Survival Kit	35.....	150.....	5250
New Totals	2269.....	10.81.....	24534

Now the aircraft is at an acceptable weight and balance for flight.

Rear sample loading:

	Wt. Lbs	Arm, inches	Moment
Empty weight.....	1938.....	6.79".....	13164
Front seats.....	440.....	15".....	6600
Rear seats.....	400.....	50".....	20000
Fuel.....	480.....	29".....	13920
Baggage.....	242.....	70".....	16940
Totals.....	3500.....	20.18".....	70624

Total moment 70624 divided by total weight 3500 = 20.18" aft of datum or 33.63% of wing cord. This is between the limits of 10.8" and 20.4". The aircraft is at an acceptable weight and balance for flight.

GENERAL SPECIFICATIONS

GROSS WEIGHT.....	3500 lbs.
EMPTY WEIGHT.....	1690 lbs.
USEFUL LOAD.....	1310 lbs.
G – LOADING (ultimate).....	+ 5.7 – 3.8
FUEL CAPACITY.....	80 US gal.
WING SPAN.....	36 ft.
WING AREA... ..	182 sq.ft.
WING LOADING.....	16.48 lbs./sq.ft.
LENGTH.....	23 ft.
FUSELAGE WIDTH.....	44”
WIND CORD.....	60”
TAIL SPAN	130”
TAIL CORD.....	33.5”
AIRFOIL.....	modified 4415
FLAP AREA.....	22.5 sq.ft.
FLAP DROOP(degrees)...3 notches.....	14..27..40.
AILERON AREA.....	25.5 sq.ft.
Ailerons aerodynamic and mass balanced	
Simple Flaps	

PERFORMANCE SPECIFICATIONS AT GROSS WEIGHT (3500 lbs)

NOTE: Based on standard temperature 15 C at sea level

ENGINE, M14P-XDK..9 cylinder radial.....	360 H.P.
POWER LOADING.....	9.72 lbs.hp.
TAKE OFF RUN.....	600 ft.
LANDING ROLL.....	800 ft.
RATE OF CLIMB.....	1200 ft. min.
FULL FLAP STALL, power off.....	58 mph.
NO FLAP STALL, power off.....	63 mph.
CRUISE (50% power).....	145 mph.
TOP SPEED.....	160 mph.
FUEL BURN (50% power).....	15 US gal/hr.
ENDURANCE.....	6 hrs.
RANGE.....	784 st mi.
FUEL CAPACITY (standard).....	80 US gal.

NORMAL PROCEDURES

PREFLIGHT INSPECTION

COCKPIT

- a) Control locks (if fitted) removed.
- b) Magneto switch OFF keys out.
- c) Master switch ON.
- d) Check strobes, landing light, fuel gauges, nav. lights, and electric trim at neutral (green).
- e) Master Switch **OFF**.
- f) Operate flaps through range. Leave at full flap.
- g) Fuel taps both ON.
- h) First aid kit and fire extinguisher in place.
- i) Req. documents on board.
- j) Record hobbs

FRONT

- a) Cowling secure, intake clear.
- b) Propeller for security and nicks.
- c) Spinner for security and cracks.
- d) Exhaust for security and cracks.
- e) Oil contents 12 qts. Long trip, min 9 qts)
- f) Inspect front sump fuel sample.
- g) Inspect windshield for cracks and security.

LEFT FRONT

- a) Inspect front side panel and lower lift strut area for damage and security.
- b) Inspect landing gear leg for signs of for and aft movement and security.
- c) Inspect brake lines for fraying and leakage.
- d) Inspect brake pads for wear and rotors for security.
- e) Inspect wheels and axle for security.
- f) Inspect tires for proper inflation and wear.

LEFT WING

- A) Inspect left wing leading edge for damage.
- B) Inspect wing tip and lights.
- C) Inspect aileron operation and security.
- D) Inspect flap operation and security.
- E) Inspect upper lift strut for security.
- F) Take and inspect fuel sample from left wing.
- G) Inspect fuel quantity, vent and cap security.
- H) Pitot inlet clear.

LEFT SIDE

- a) Inspect door operation and latch for security.
- b) Inspect window for operation and security.
- c) Baggage securely tied down.
- d) Baggage door secure and locked.
- e) Inspect antennas for security.

TAIL GROUP

- a) Fin and fin fairing secure.
- b) Horizontal stabilizer secure.
- c) Elevator secure.
- d) Elevator hinge bolts and pins secure.
- e) Elevator trim tab secure.
- f) Rudder hinge bolts and pins secure.
- g) Rudder trim secure if applicable.
- h) Rudder horn for freedom of movement and security.
- i) Rudder cables and turnbuckles for safety and security.

TAILWHEEL

- a) Tailwheel stinger for damage and security.
- b) Tailwheel for security and condition.
- c) Tailwheel springs and chains for wear.
- d) Tailwheel swivel for freedom of movement.

RIGHT SIDE

- a) Inspect right side of fuselage.
- b) Inspect window and door for operation and security.
- c) Take and inspect fuel sample from fuselage bottom.
- d) Inspect antennas for security.

RIGHT WING

- a) Take and inspect fuel sample from right wing.
- b) Inspect flap for security and operation.
- c) Inspect aileron for security and operation.
- d) Inspect wing tip and lights.
- e) Inspect leading edge for damage.
- f) Inspect upper lift strut for security.
- g) Check fuel quantity, vent and cap security.

RIGHT FRONT

- a) Inspect front side panel and lower lift strut area for security.
- b) Inspect landing gear leg for signs of for and aft movement.
- c) Inspect brake line for fraying and leakage.
- d) Inspect brake pads for wear and rotors for security.
- e) Inspect wheels and axles for security.
- f) Inspect tires for proper inflation and wear.

BEFORE START

- a) Passengers.....Brief and secure.
- b) Seat and belts..... Adjust & lock.
- c) Loose articles.....Stowed and secured.
- d) Brakes.....Test.
- e) Avionics.....Off.
- f) Fuel.....On.
- g) Flaps.....Up.
- h) Circuit breakers..... In & secure.

START M14P 360 H.P. 9cyl. Radial

- a) Master.....off.
- b) Mags.....off.
- c) Intake manifold drain.....open.
- d) Pull prop thru.....2-3 revolutions.
- e) Intake manifold drain.....close.
- f) Master.....on.
- g) Mags.....off.
- h) Electric fuel pump.....on.
- i) Electric primer.....on 6 seconds.
- j) Master.....off.
- k) Pull prop thru.....4 revolutions.
- l) Oil shut off valve (if applicable).....on.
- m) Alt air.....close.
- n) Prop.....fine.
- o) Master.....on.
- p) Electric fuel pump.....on.
- q) Electric primer.....on 3-4 seconds.
- r) Open throttle approx. 1/4 " travel.
- s) Controls.....up elevator.
- t) Brakes.....on.
- u) LOOKOUT.....call "CLEAR PROP"
- v) Starter.....engage untill engine is started.
- w) Mags.....on both.

OIL PRESSURE WITHIN 30 sec.or SHUT DOWN

AFTER START

- a) R.P.M..... Set 1000.
- b) Oil pressure..... in the green.
- c) Amps, volts..... in the green.
- d) Suction..... 3" to 5"
- e) Heading..... set.
- f) Clock..... set.
- g) Avionics.....on.
- i) Altimeter..... set.
- j) Strobes.....on.

TAXI

- a) Brakes..... check.
- b) Steering..... check.
- c) Heading.....check.

RUN UP

- a) Position..... Into wind & clear all round.
- b) Brakes on.
- c) Doors & windows.....closed.
- e) Flight controls.....up elevator.
- f) Flight instruments.....check.
- g) Fuel.....on.
- h) Boost pump.....off.
- i) R.P.M..... 2000

Magnetos check:

LEFT - RIGHT - BOTH

- Max. drop..... 175 rpm.
- Max. diff. between mags...50 rpm.
- j) Engine instruments.....in the green.
- k) Prop.....cycle 500 rpm.
- l) Alt air.....open.....max. drop 75rpm.....set closed.
- n) R.P.M..... Idle 500 - 700..... Reset 1000

PRE-TAKE OFF AND VITAL ACTIONS

- a) Trim..... set for take off.
- b) Throttle..... friction nut set.
- c) Alt air.....closed.
- d) Fuel..... on & sufficient.
- e) Prop.....full fine.
- f) Flap..... set 1 to 2 notches.
- g) Instruments.....in the green.
- h) Loose articles.....stowed.
- i) Seatbelts..... secure.
- j) Controls..... free & correct.
- k) Transponder.....on.
- l) Lookout.....proceed when clear.

Normal Takeoff

- a) Flaps..... 2 notch.
- b) Throttle.....smoothly to full, 2900 min.
- c) Elevator.....tail lifts at.....40-45 mph.
- d) Slight back pressure to fly off at.....55 mph.
- e) Climb.....80 mph.
- f) Flaps reduce to 1 notch.....500 ft.
- g) Flaps up.....when level or above 120 mph.

Short Field Take Off

- a) Flaps.....3 notch.
- b) Alt air.....closed.
- c) Brakes.....apply.
- d) Throttle.....full.
- e) Brakes.....release.
- f) Elevator.....slightly lift tail.
- g) Slight back pressure to fly off at.....55 mph.
- h) Climb, (best angle).....65-70 mph.

(Flaps up slowly after all obstacles cleared.)

ENROUTE CLIMB

- a) Airspeed.....90-100 mph.
- b) Flap.....(up to 120 mph)..... 1 notch.
- c) Throttle.....full.

LANDING CHECKS

- a) Fuel.....on.
- b) Prop.....2400 rpm.
- c) Hatches & harness's.....secure.
- d) Brakes.....off.

AIRSPEED AND FLAPS

- a) Downwind...flaps 1.....85 mph.
- b) Base leg.....flaps 2.....70-75 mph.
- c) Final.....flaps 3.....60-65 mph.

Crosswind technique - Wing low, use aileron to keep wing down, USE BRAKES TO KEEP STRAIGHT.

AFTER LANDING

- a) Flaps..... Up.
- b) Trim..... Neutral (green).
- c) Non essential electrics..... Off.

SHUT DOWN

- a) Brakes..... on.
- b) R.P.M. 1500 for 20 secs.
- c) Radios & electrics..... off.
- d) Magnetos.....off.
- e) Oil shut off.....off.
- f) Electric oil sump pump.....on until dry 1-2 min.
- g) Master Switch.....off.
- h) Control locks.....in place.

NOTES